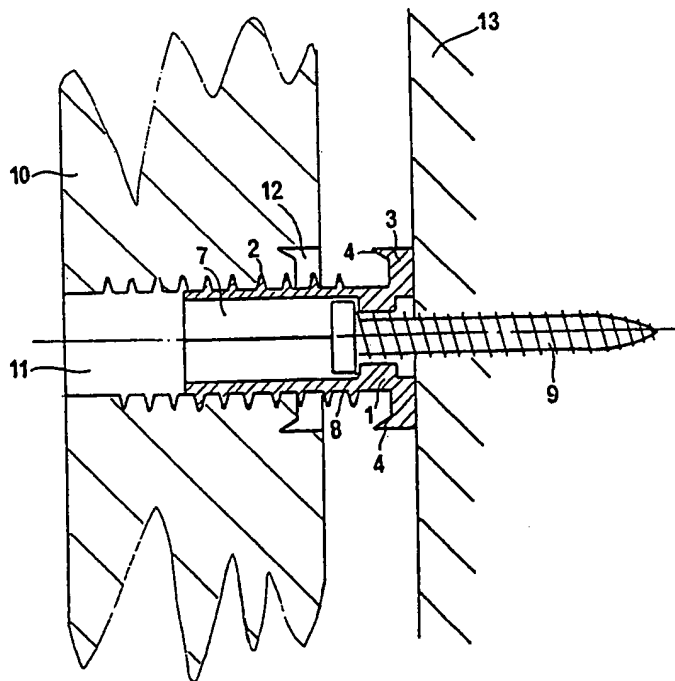


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: AN ADJUSTABLE FASTENER



## (57) Abstract

An adjustable fastener (1) for joining two structural members which, preferably, consist of a door or window sash (10) and a surrounding stationary building structure (13). The fastener comprises an externally threaded stem (2) and a head (3) which is, preferably, polygonal. The fastener has a through hole (7) in its longitudinal direction, which at least in the lower portion of the stem, is also polygonal. Head (3) is provided with a stop (8) for a screw head or the like, and the underside of the head is provided with one or a number of cutting edge(s) (4, 4', and 5, 5', resp.).

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An adjustable fastener

4 The present invention relates to an adjustable fastener for  
use in joining two structural members, preferably consisting  
5 of a door or window sash and a surrounding stationary build-  
ing structure.

It is known to use adjustable fastening means in connection  
with mounting sashes frames or the like in adapted openings  
10 in building structures of various kinds. Such adjustable  
fastening means are, inter alia disclosed in NO-PS No.  
152 807 and No. 155 784, the inventor in the latter cases  
being the same as in the present patent application. In the  
mentioned patents the fastening means in principle consists  
15 of a hollow internally threaded holder member, which is  
mounted in an adapted through hole in a sash or a frame to be  
joined with a surrounding building structure, and on the side  
facing the building structure. Holder member is firmly locked  
in a desired position by the aid of an additional locking ring,  
20 or by holder member proper being provided with a locking  
member. Fastening means according to known technology, further-  
more, comprise a load transmitting member, which is threaded  
externally to be screwed into said holder member, and which  
comprises a head to sit in contact with the surrounding  
25 building structure. Load transmitting member also has a  
through hole which is completely or partly designed with a  
polygonal cross section, and which adjacent said head is  
provided with a stop member for the head of a screw which  
may be inserted from the other side of the sash into load  
30 transmitting member, thus, to be screwed into the building  
structure to secure the load transmitting member to said  
structure. When said screw is not tightened so as to lock  
load transmitting member firmly to the building structure, it  
is possible to rotate load transmitting member in one or the  
35 other direction by inserting a tool into the hole on the in-  
side of the sash, and to engagement with the polygon hole of  
load transmitting member. In this manner the distance

between sash and surrounding building structure may be adjusted. It will readily be understood that all four external sides of the sash or frame must be provided with at least one adjustable fastening means of the mentioned kind.

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The above mentioned kind of fastener means is used in connection with sashes and frames of wooden material. As regards relatively heavy and large sashes, etc. the known fastening means, besides providing a flexible and adjustable connection they also provide a very strong connection. It would, obviously be advantageous if manufacturers of doors and windows could deliver sashes and frames with mounted fasteners. Previously, this was, however, not the case, due to the fact that the fastening means project from respective sashes or frames, inter alia, with heads of the load transmitting members, which prevents efficient stapling for storage and transport. This, in turn, caused the adjustable fastening means to be mounted at the contractors', and commonly directly on the building site.

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As regards most smaller and more lightweight sashes, frames, etc. of wooden materials, sufficient stability proved to be achieved when the load transmitting member is mounted directly in a pre-threaded hole in respective sash or frame, i.e. without use of a holder member which is preferably of metal. In this case the load transmitting member proper, thus, constitutes the adjustable fastener, which is the designation used below.

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It is an object of the present invention to be able to mount such fasteners, which only comprise the load transmitting member proper, on respective sashes and frames in such a manner that no part of the fastener projects. An obvious manner to achieve this, would be to drill a groove in advance in the external portion of the hole in the frame, etc., which is adapted to the head of the fastener. In this manner it would be possible to screw the fastener so far into the hole

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that its head is completely recessed in the additional drilled groove. This would, however, entail an additional drilling operation and would, thus, have to be regarded as a disadvantage.

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According to the present invention the above mentioned object is achieved in a simple manner by the fact that a fastener is provided, which substantially consists of an externally threaded stem, and a head which is preferably polygonal, 10 which fastener has a through hole in its longitudinal direction, which at least in the lower portion of the stem is polygonal and which in the head portion is provided with a stop for a screw head, or the like. The fastener is substantially characterized by the fact that the underside of its head is 15 provided with one or a number of cutting element(s).

When the fastener is screwed into an adapted threaded hole in a sash, frame, etc., and is screwed so far that said head engages the surface of a sash or frame, said cutting edge(s) 20 be screwed into the sash, frame, etc.

According to a preferred embodiment of the invention two or more diametral and vertical cutting edges are provided on the external edge portion of the head, as well as two or more 25 radial cutting edges, which are slightly more shallow than said diametral and vertical cutting edges, radially provided. When the head is screwed into the surface of the sash or frame, the external vertical cutting edges will, thus, engage first and cut the surface to form a circular groove. Then the 30 radial cutting edges will engage and cut material inside said circular groove.

In order to avoid that wooden chips which are cut off below the head of the fastener will be forced out onto the side of 35 the head, where wooden chips would tear and damage, especially the edge of the drilled groove, the fastener head is according to a preferred embodiment provided with one or a

number of, preferably, radial recesses. In this manner cut off wooden material will automatically be discharged when the head is screwed into the sash, frame, etc.

- 5 An embodiment of the invention is disclosed in more detail below, inter alia by the aid of drawings, in which

Figure 1 shows a perspective view of the fastener as well as a screw, and

- 10 Figure 2 shows the fastener and screw mounted for joining a door or window sash with a surrounding building structure.

Figure 1 shows the screw 9 and, furthermore, fastener 1 with  
15 powerful self-cutting threads 2. From the lower faces of head 3 and from the external edge portion of head 3 two diametrically opposed and vertical cutting edges 4,4' project. 5 designates a radial cutting edge which is slightly more shallow than cutting edges 4, 4'. On the opposite side of the head (partly  
20 visible) a corresponding radial cutting edge 5' is provided. 6 designates a radial recess in the head, and on the opposite side of the head (not shown) there is a corresponding recess 6'. Head 3 of the fastener is polygonally designed, and the same goes for the lower portion of through hole 7 in the  
25 fastener.

Figure 2 shows a fastener in a finished mounted state. Fastener 1 is mounted in a through hole 11 in sash structure 10, which is of a soft material, preferably wood. Originally, and  
30 during storage, transport, etc. the fastener head 3 was screwed into and, thus, recessed in a self-made groove 12 in sash 10. From this recessed position fastener 1 with head 3 is screwed slightly out of the sash during mounting, so that head 3 contacts the stationary building structure 13. This  
35 adjustment of fastener 1 is either achieved by insertion of a tool through hole 11 in the sash for engagement with polygonal head 7 of fastener 1, or by the aid of a tool through the

slot between sash 10 and building structure 13 for engagement with polygonal head 3 of the fastener. When the fastener is adjusted, and has its head 3 in contact with building structure 13, the fastener is firmly attached to the building structure by the aid of a screw 9, the head of which is made to contact stop 8 in hole 7 of fastener 1.

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## CLAIMS:

1. An adjustable fastener (1) for joining two structural members which preferably constitute a door or window sash (10) and a surrounding stationary building structure (13), fastener (1) consisting of an externally threaded stem (2), and a head (3) which is preferably polygonal, and with fastener (1) being provided with a through hole (7) in its longitudinal direction, which hole is polygonal, at least in the lower portion of the stem, and which in the head portion is provided with a stop (8) for a screw head, or the like, characterized in that the underside of head (3) is provided with one or a number of cutting edge(s) (4, 4' and 5,5', resp.).
2. A fastener as stated in claim 1, characterized in that head (3) is provided with one or a number of recess(es) (6), preferably being radial.
3. A fastener as stated in claim 1, characterized in that two or more cutting edges (4,4') are provided diametrically opposed and vertically on the external edge portion of head (3), and that two or more cutting edges (5,5') are provided radially.
4. A fastener as stated in claim 3, characterized in that the vertical cutting edges (4,4') project further out than said radial cutting edges (5,5').



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Fig.1

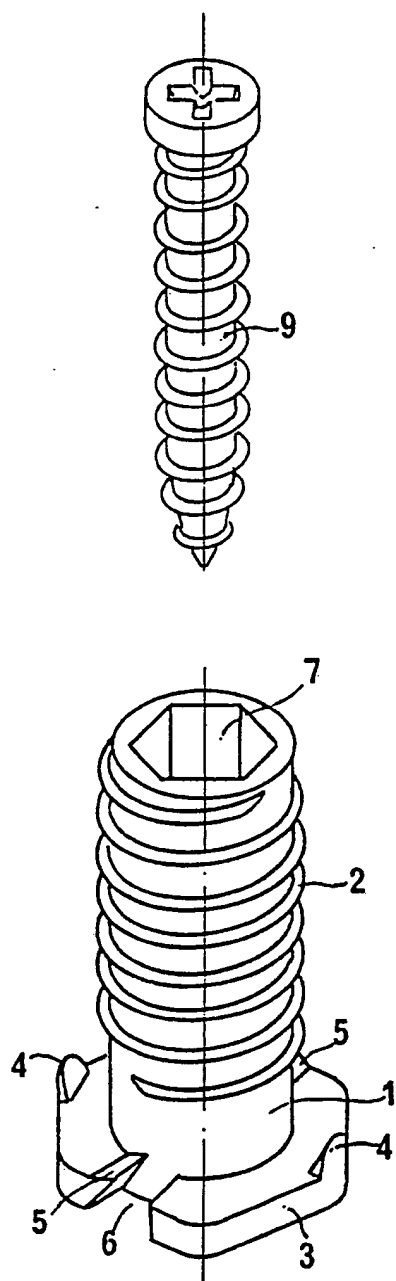
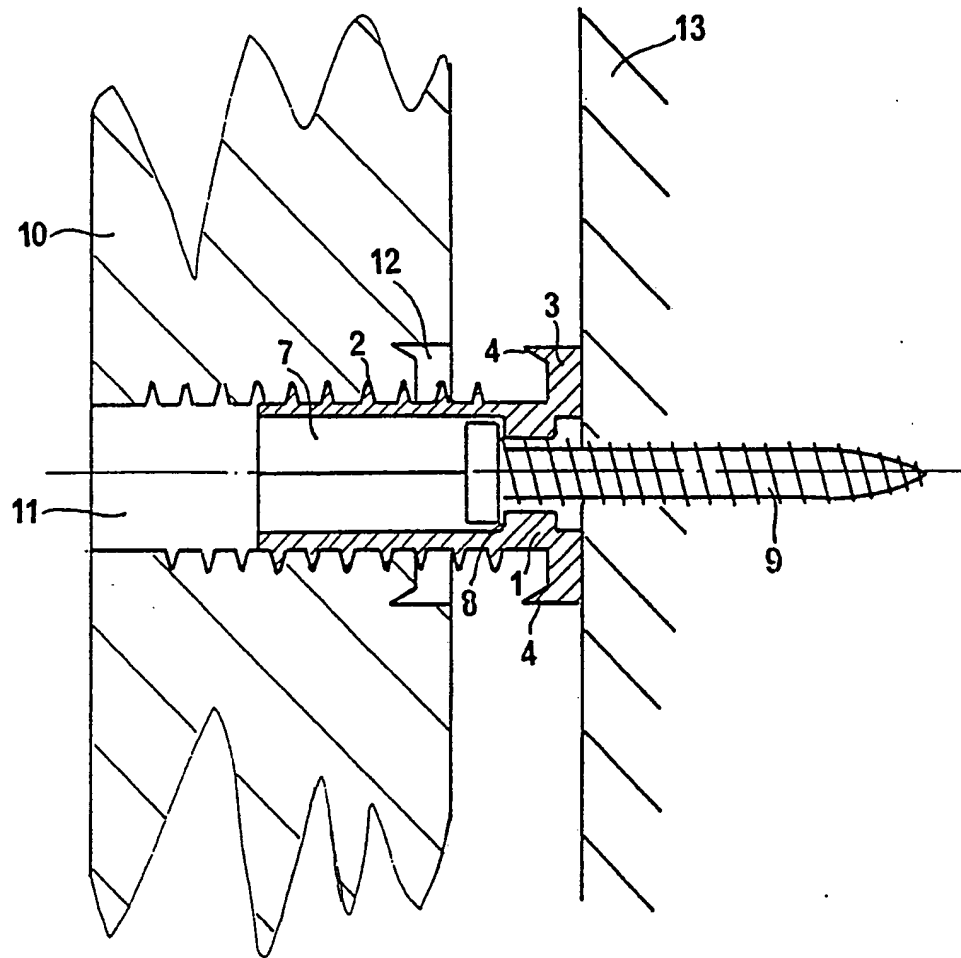


Fig. 2



# INTERNATIONAL SEARCH REPORT

International Application No PCT/NO 89/00110

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup> According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: E 06 B 1/60, F 16 B 25/02		
<b>II. FIELDS SEARCHED</b> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin: 5px 0;">Minimum Documentation Searched <sup>7</sup></div> <div style="display: flex; justify-content: space-between;"> <span>Classification System <sup>8</sup></span> <span>Classification Symbols</span> </div> <div style="margin-top: 10px;">           IPC5 : E 06 B; F 16 B         </div> <div style="text-align: center; border-top: 1px solid black; border-bottom: 1px solid black; margin-top: 10px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>9</sup></div> <div style="margin-top: 10px;">           SE,DK,FI,NO classes as above         </div>		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT <sup>5</sup></b>		
Category <sup>10</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
Y	SE, C, 188650 (AB GUSTAF KÄHR) 14 April 1964, see figure 2 <div style="text-align: center;">--</div>	1-4
Y	US, A, 1238636 (C.L. CHRISTOFFERSON) 28 August 1917, see the whole document <div style="text-align: center;">--</div>	1-4
A	US, A, 2764053 (L.J. LOVISEK) 25 September 1956, see the whole document <div style="text-align: center;">--</div>	
P	EP, A1, 0319817 (A. WÜRTH GMBH & CO. KG) 14 June 1989, see the whole document <div style="text-align: center;">--</div>	
A	<div style="text-align: center;">-----</div>	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><sup>14</sup> Special categories of cited documents: <sup>15</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p> </div> </div>		
<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search 18th January 1990		Date of Mailing of this International Search Report 1990 -01- 29
International Searching Authority <div style="text-align: center;">SWEDISH PATENT OFFICE</div>		Signature of Authorized Officer Leif Törn <i>Leif Törn</i>

ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO. PCT/NO 89/00110

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
SE-C- 188650	14/04/64	NONE	
US-A- 1238636	28/08/17	NONE	
US-A- 2764053	25/09/56	NONE	
EP-A1- 0319817	14/06/89	DE-A- 3741236	15/06/89

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